

CLAIMS

1. Apparatus for positioning and cementing a component of or for a prosthesis, the apparatus comprising means for positioning the component in or adjacent a bone cavity, cement delivery means for providing cement under pressure to a cavity space next to the component whilst the component is in its desired position, and a seal carried by the cement delivery means and arranged to confine the cement in such space until it has set.
2. The apparatus of claim 1, wherein the component is part of a joint prosthesis for mounting in a natural cavity of a joint.
3. The apparatus of claim 1 or claim 2, wherein the component is a cup component of an artificial hip prosthesis for mounting in the acetabular socket of a hip.
4. The apparatus of any one of claims 1 to 3, wherein the means for positioning the component in or adjacent a bone cavity comprises a tool provided with carrying means on which the component for the prosthesis is releasably mounted.
5. An apparatus for positioning a component of or for a prosthesis, the apparatus comprising a tool having a distal end to which the component is releasably mountable such that the component is fixed to the tool and can be carried and manipulated thereby, wherein the tool also has cement delivery means for cementing the component or in a cavity in a bone within the body whilst the component is still mounted to the tool and positioned thereby.
6. The apparatus of claim 5, further comprising a seal

for confining the cavity in which the component is to be cemented.

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- 5 7. The apparatus of any one of claims 4 to 6, wherein the tool includes an elongate, tubular housing, and the means for releasably mounting the component is provided at the distal end of the housing.
- 10 8. The apparatus of any one of claims 1 to 7, further comprising an endoscope for providing the surgeon with an image of the site of the component to assist guidance and location.
- 15 9. The apparatus of any one of claims 1 to 8, further comprising a temperature and/or pressure transducer to either aid automation or to assist a surgeon in noting pressure being applied or the temperature of the cement as it sets.
- 20 10. The apparatus of any one of claims 1 to 4 or 6 to 9, further comprising means for forcing cement under pressure, through a tube, and into the space defined by the cavity and the component and confined by the seal.
- 25 11. The apparatus of any one of claims 1 to 10, wherein the cement is supplied via one or more apertures in the component itself.
- 30 12. A cup-shaped component of or for a prosthesis, which component is intended to be cemented in position, and which includes one or more apertures which are arranged such that cement may be supplied to a space surrounding and/or underlying the component in use.
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a2 13 The apparatus of any one of claims 1 to 11, further comprising a mating part engageable with the component and locking means for releasably locking the component

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thereto.

14. The apparatus of claim 13 wherein the locking means comprise retractable locking elements carried by the mating part that cooperate between the mating part and the cup component.

15. The apparatus of claim 13, wherein the locking means comprises means for attaching the component to the mating part tool by suction.

16. The apparatus of claim 15, wherein the mating part comprises a head arranged to cooperate with the component, the head having a seal for providing an airtight seal between the head and the component and a passage through which the pressure within the space defined by the seal, the head and the component can be reduced to lock the component on the head of the tool.

17. The apparatus of claim 16, wherein the means for providing a seal is an 'O'-ring seal.

18. The apparatus of claim 16 or claim 17, wherein an external surface of the head co-operates with an inside surface of a cup-shaped component to bound the defined space.

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19. A apparatus for positioning a component in a human or animal body, the apparatus comprising an elongate body having a head with a surface arranged to cooperate a surface of the component; a seal for sealing a perimeter of the cooperating surfaces; and a passage for withdrawing air from the space defined by the sealed surfaces so as to releasably hold the component on the head of the tool.

20. The apparatus of any one of claims 1 to 11 or 13 to

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19, including one or more cement delivery orifices which communicate with aperture(s) in the component, so that, in use, cement can be supplied, via the aperture(s) to the space beneath and/or surrounding the component whilst the component is locked to, and thereby correctly positioned by, the tool.

21. A joint prosthesis for replacing the socket of a ball and socket joint, the joint prosthesis having a generally cup-shaped anchoring means which has one or more apertures through which cement may be provided.

22. The joint prosthesis of claim 21 or claim 22, wherein the joint prosthesis is a socket and an aperture(s) are located close to the rim of the socket.

23. The joint prosthesis of claim 21 or claim 22, wherein the anchoring means is detachably mounted to an articulation component of the prosthesis and comprises further means for mounting or receiving such component.

24. The joint prosthesis of claim 23, wherein the articulation component is mounted to the anchoring means by a tapering fit.

25. The joint prosthesis of claim 23, wherein the articulation component is mounted to the anchoring means by corresponding internal and external screw threads on the articulation component and the anchoring means.

26. The joint prosthesis of any one of claims 21 to 25, further comprising one or more protrusions which engage the bone and which help maintain the desired position during cement delivery.

27. The apparatus of any one of claims 1 to 4, 6 to 11 or 13 to 18, wherein the seal is a generally annular or

doughnut shape extending around the cement delivery means such that the seal cooperates in use with the bone surrounding the site for the component.

5 28. The apparatus of claim 27, wherein the seal comprises an inflatable balloon.

10 29. The apparatus of claim 28, further comprising retaining means for radially confining the deflated balloon whilst the tool is being manipulated in the body.

15 30. The apparatus of claim 29, wherein the retaining means comprises a plurality of pins which are initially fixed and extend approximately parallel to the axis of the tool, over the balloon.

20 31. The apparatus of claim 30, wherein the pins are releasable at their distal ends, and are pivotal in relation to the tool at their proximal ends so that they can be pushed outwardly when the balloon is inflated into its sealing condition.

25 32. The apparatus of claim 30 or claim 31, wherein the pins provide additional support behind the seal when it has been fully inflated.

30 33. An apparatus for delivering fluid to a cavity in a bone, the apparatus comprising an elongate supply means having a generally ring or doughnut shaped seal which is carried within the radial dimensions of the supply means as the supply means is inserted, in use, through an orifice into a position for delivering fluid and is expandable outside the radial dimensions of the supply means to seal the cavity whilst fluid is supplied in use
35 from the supply means to the cavity.

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34. An apparatus for sealing a cavity within a human or animal body, the apparatus comprising an elongate housing and annular seal for sealing the cavity, the seal being confined within the radial dimensions of the elongate housing for insertion of the tool into the human or animal body and expandable beyond the radial dimensions of the elongate housing to seal the cavity.

35. The apparatus of any one of claims 29 to 34, wherein the seal is a balloon and the retaining means comprises means for extending the balloon along the length of the cement delivery means or housing.

36. The apparatus of any one of claims 29 to 35, wherein the seal is a balloon having a natural relaxed diameter larger than the diameter of the tool and said retaining means is effective to retain the excess balloon material within the diameter of the tool or cement delivery device during insertion.

37. The tool of any one of claims 28 to 36, wherein the balloon is made of latex.

38. The tool of claim 37, wherein the balloon has a thickness of between 0.6 mm and 1 mm.

39. An apparatus for cementing a prosthetic component in place, comprising cement delivery means and a generally ring or doughnut shaped balloon which is carried by a part through which cement for cementing the component in place is supplied in use.

40. The apparatus of any one of claims 1 to 20 or 27 to 33, wherein the cement delivery means comprises plural elongate tubes which can extend into a bore or channel in which the component is located and simultaneously provide cement at different radial locations around the

component.

41. An apparatus for delivering cement around a component located in a recess, bore or canal in a bone, the apparatus comprising plural nozzles which can simultaneously provide cement at different circumferential locations around the component.

42. The apparatus of claim 41, wherein the nozzles are preferably in the form of elongate tubes which can extend, in use, into a bone cavity such as an elongate bore or canal.

43. The apparatus of claim 41 or 42, wherein the tubes are flexible.

44. The apparatus of claim 41, 42 or 43, having four tubes.

45. The apparatus of claim 41, 42 or 43, having one or more tubes of circumferentially elongate cross-sections.

46. A method of cementing a component of or for a prosthesis into or adjacent a bone cavity, comprising locating the component in a desired position, providing a seal, and providing cement under pressure into a cavity space next to the component and confined by the seal.

47. The method of claim 46, wherein the provision of the seal comprises locating over the cavity a seal carried by the cement delivery means.

48. The method of claim 46 or claim 47, further comprising removing the seal when the cement has set.

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49. The method of any of claims 46 to 48, further comprising pressurising the cement with the component in its intended final position.
- 5 50. The method of any one of claims 46 to 49, further comprising inserting and locating the component through an incision distal from the intended position of the component.
- 10 51. The method of claim 50, further comprising inserting and locating the component through a bore in a bone.
- 15 52. A method of cementing a cup-shaped component of or for a prosthesis, in which cement is provided to a space surrounding and/or underlying the component via one or more apertures in the component.
- 20 53. A method of delivering cement around a component located in a recess, bore or canal of a bone, the method comprising providing cement through one or more elongate tubes and retracting the tube(s) from the recess, bore or canal as the cement is delivered.
- 25 54. The method of claim 53, further comprising moving the tube(s) circumferentially around the prosthesis as the cement is delivered.